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Office Memorandum • UNITED STATES GOVERNMENT

TO : The Files

DATE: 23 September 1960

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FROM :

SUBJECT: TAILOR Transmitter Module Evaluation

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1. TAILOR transmitter modules were received at the R&D Laboratory for prototype acceptance tests. Enough modular units were provided to assemble approximately seven complete systems with A-1, A-2, and A-3 modulation with 0.5 and 5.0 watt RF output. Three of these systems were assembled as plug-in versions for A-1 mode only. These three were subjected to tests first. Also, the wire-together units were tested starting with the RF oscillator.

2. During the early phase of the evaluation, the test results showed serious shortcomings and as a result the tests were stopped. A summary of test data obtained, up to the time the tests were stopped, follow. Figures 1 and 2 show keyed waveforms typical of Bands I and III.

3. Plug-in, 5 Watt, A-1, System

3.1. Test Results of System with Serial #125, Band I

RF Power Output: 4.0 watts @ 3 mc
5.1 watts @ 5 mc
2.4 watts @ 7.5 mc

Keyed Waveform: Poor, 12 millisecond delay

Tuning: Very difficult to tune from the points of manipulation of knobs and peaking of circuits.

Side Tone: Excessive earphone key click.

3.2. Test Results of System with Serial #128, Band II

RF Power Output: 4.3 to 5.8 watts @ 7.5 mc
6.1 to 6.9 watts @ 10 mc
5.4 to 6.5 watts @ 15 mc

Keyed Waveform: The RF oscillator ceases to key when 1/2 watt amp. is peaked for max. output.

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3.3. Test Results of System with Serial #121, Band III

RF Power Output:	2.0 to 3.2 watts @ 15 mc 3.7 to 5.0 watts @ 20 mc 2.5 to 3.9 watts @ 30 mc
Keyed Waveform:	Poor, 12 millisecond delay
Tuning:	Difficult to tune to the correct frequency.

4. Wire-together Systems

4.1. RF Oscillator Test Results, Band I (Comments)

a. Four out of five oscillators would not key at the low end of the band.

b. All units exhibited delayed waveforms which varied from 2 to 12 milliseconds.

c. One unit had 10 millisecond rise time at 7.5 mc and 8 millisecond rise time at 5.0 mc.

d. One unit ceased to operate after short-time use.

e. Only one unit provided rated power output across its band.

4.2. RF Oscillator Test Results, Band II (Comments)

a. All oscillators operated satisfactorily when loaded with a 51 ohm resistive load except for low power output.

b. The oscillator, when operating in conjunction with the 0.5 watt amplifier, did not operate satisfactorily. At the low end of the band there was a delay in the keyed waveform which varied from 2 to 4 milliseconds (unstable); three out of seven would not key at the low end of the band.

c. Only one unit exhibited satisfactory performance as a 1/2 watt A-1 mode transmitter.

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4.3. RF Oscillator Test Results, Band III (Comments)

a. Four out of seven units failed to operate because of voltage arc-over at the oscillator tuning capacitor. Two units exhibited low power output and excessively delayed keyed waveforms. One unit would not operate because of improperly assembled band switch.

5. Conclusion: It is felt that time and effort would be wasted to continue with the evaluation of this equipment unless it is desirable to hand-pick, say, one operable system from each mode and power requirement. Even this selection is likely unobtainable in some areas unless just barely operable units could be considered acceptable.

The shortcomings of these units are felt to be primarily design difficulties. The excessive delay in the keyed waveform is believed to be caused by insufficient feedback. The stoppage of oscillation of the RF oscillator when the 0.5 watt amplifier is peaked for maximum power output is probably caused by too much feedback. The voltage arc-over on Band III tuning capacitors is obviously caused by inadequate voltage rating of that component. The cause for low power output appears to originate at the oscillator, however, mismatch is apparent in some cases.

The difficulty in tuning is caused by too many controls and the difficult manipulation of these controls.

This equipment has DC to DC converters and antenna tuning indicators which operate satisfactorily.

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Attachments:
Figure 1
Figure 2

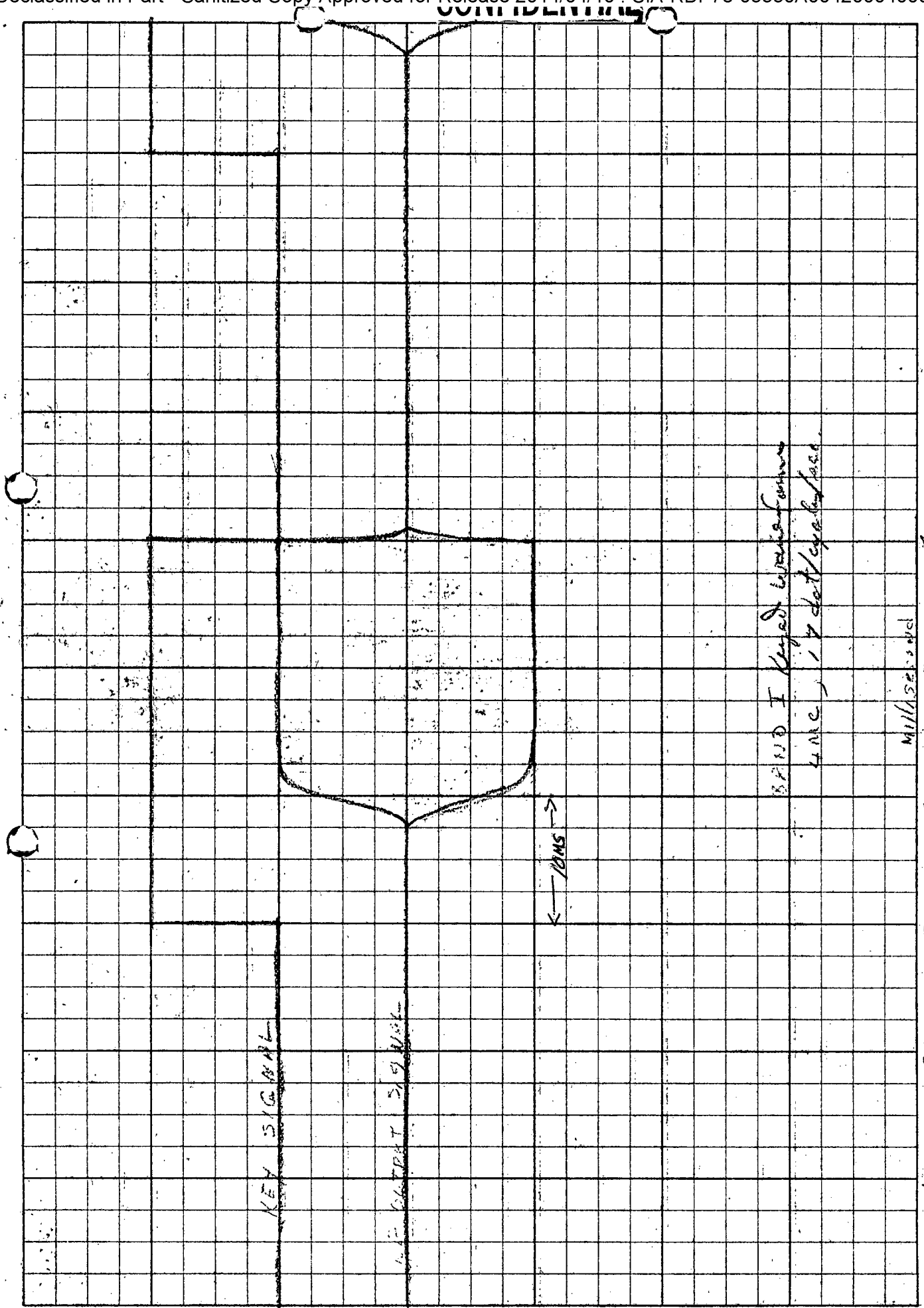

FIG. I

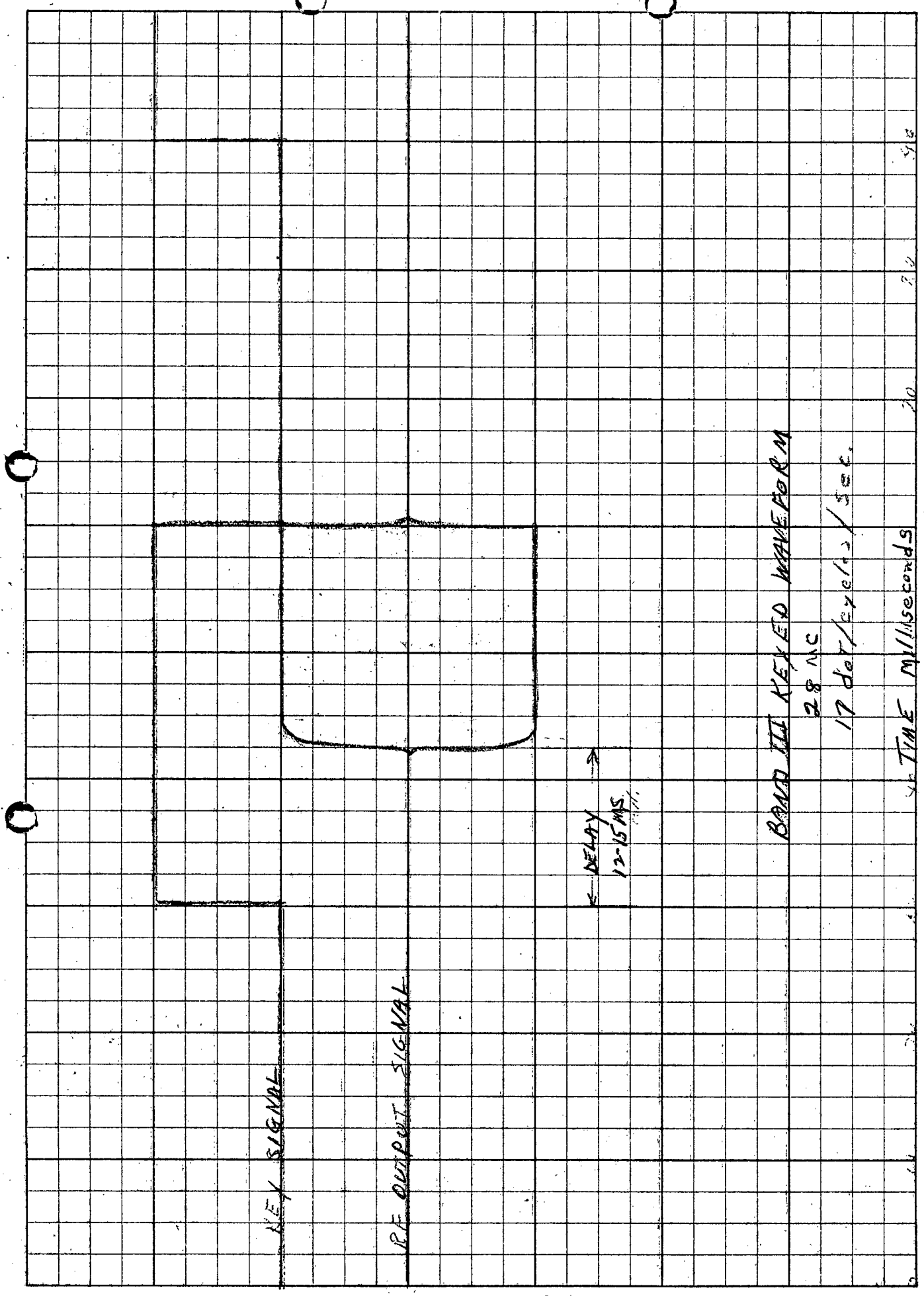

FIG. II